C Mandet), Boucicaut (B Patri, P Bellaiche) Cochin (D Sicard, D Salmon, L Héripret), Croix-Saint-Simon (G Raguin) Fernand-Vidal (F Questel) Georges-Pompidou (M Kazatchkine, H Durand, W Lowenstein, L Weiss, D Batisse, Marinier-Roger, D Tisné-Dessus), Laennec (JM Andrieu, FC Hugues, F Dendoune) Lariboisière (C Caulin, JM Salord, N Bonfanty) Moulin-Joly (M Bary) Necker (B Dupont, JP Viard) Pitié-Salpétrière (S Herson, A Simon-Coutellier, F Bricaire, P Bossi, L El Hajj, V Zeller, C Brançon) Rothschild (W Rozenbaum, S Thévenet) Saint-Antoine (PM Girard, JC Imbert, O Picard, MC Meyohas, JL Meynard, N Desplanques, D Berriot, B Gaujour) Saint-Louis (P Morel, D Séréni, C Lascoux-Combes, JM Decazes, JM Molina, D Ponscarme) Saint-Joseph (J Gilquin, A Cros) Tenon (CY Mayaud, E Bergot, M Wislez, C Zurita), Périgueux (P Lataste, M Roques), Perpignan (H Cros), Pessac (JL Pellegrin, S Tchamgoué), Pointe-à-Pitre (M Strobel), Poissy (H Masson), Poitiers (B Becq-Giraudon, G Le Moal), Pontoise (O Danne), Quimper (P Perfezon), Reims (G Rémy, C Rouger, I Béguinot), Rennes (C Michelet, C Arvieux, MC Delmont), Roanne (G Chaumentin), Rochefort (MT Climas), Rouen (F Caron, I Gueit, F Lecomte), Saint Brieuc (G Dien, C Devaurs), Saint Denis (D Méchali, MA Khuong), Saint Denis de la Réunion (C Gaud), Saint Etienne (F Lucht, A Frésard, P Cathebras, V Ronat), Saint Laurent du Maroni (F Bissuel), Saint Lo (P Hazera), Saint Mandé (R Roué, T Debord), Saint Michel (M Bonnefoy), Saint Nazaire (C Micheau), Saint Omer (H Monnot), Saint Pierre de la Réunion (P Poubeau), Saintes (T Pasdeloup), Sarrebourg (E Grillat), Saverne (F Loth), Sète (B Kitschke), Soissons (D Line), Strasbourg (JM Lang, P Fraisse, G Ruellan, P Fisher), Suresnes (O Blétry, D Zucman), Tarbes (J Petitou), Thionville (M Grandidier), Toulon (A Lafeuillade, JP de Jaureguiberry), Toulouse (P Massip, L Cuzin), Tourcoing (Y Mouton, F Ajana), Tours (P Choutet, JM Besnier), Troyes (E Libbrecht), Valence (R Riou), Valenciennes (C Fontier), Vandoeuvre-les-Nancy (T May, S Bévilacqua), Vernon (Richard), Villejuif (D Vittecoq, M Malet, MH Salamagne, C Boliot), Villeneuve-Saint-Georges (C Lafaix, O Patey), Villeneuve-sur-Lot (E Buy).

IJE vol.34 no.1 © International Epidemiological Association 2005; all rights reserved.
Advance Access publication 13 January 2005

International Journal of Epidemiology 2005;**34**:130–131
doi:10.1093/ije/dyh402

Commentary: Death in the era of potent antiretroviral therapy: shifting causes, new challenges

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Several studies have shown that the introduction of highly active antiretroviral therapies (HAART) has lead to a substantial reduction in HIV-associated mortality.[1–4] This in turn has resulted in a notable shift in causes of death among adults who died with or due to HIV infection.[5–11] In this issue Lewden *et al*. present the results of a nation-wide survey of the causes of death of 964 HIV-infected individuals who died in the year 2000 in 185 wards in France.[12]

Their study has several strengths. The investigators made extensive efforts to ascertain all deaths among HIV-infected individuals cared for in hospitals known to be involved in the management of HIV infection in France. They visited sites to check and enhance the completeness and accuracy of the available information. Finally, they collected an array of important and detailed information on the deceased HIV-infected individuals, going far beyond what is available from routine hospital records or death certificates.

AIDS/HIV infection was attributed to be the underlying cause of the death in about half the cases, and cancer, cardiovascular diseases, hepatitis C, and bacterial infections in a third. Of note, only three quarters of deceased patients had received HAART treatment prior to death and the excess of infections among the causes of death of HIV-infected people compared with the background population is remarkable. Most of these infections are preventable by using HAART and effective chemoprophylaxis, including *Pneumocystis* pneumonia and tuberculosis. One in nine had the HIV infection diagnosed only recently and a third lived in poor socio-economic conditions. Clearly, HIV-associated mortality is increasingly affecting individuals with multiple risk factors, including social deprivation and reduced access to health services. These important results reinforce the notion that implementing equitable access to HIV diagnosis and treatment is not only a challenge for the less developed countries but also for economically developed societies, many of whom suffer from substantial health and social disparities.

There are important concerns whether longer duration of antiretroviral therapy, known to affect various metabolic

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parameters, will result in deregulated glucose metabolism[13] and excess risk of cardiovascular diseases.[14] The data of Lewden *et al*. underline that this concern has not materialized yet, and not led to notable shifts in mortality patterns. Independent of these concerns cigarette smoking and excessive alcohol consumption is prevalent in many HIV-infected populations and it is hardly surprising that the mortality risks most prominent in the general middle-aged population, cancers and cardiovascular diseases, are also affecting those with HIV infection. Now that HAART-regimens have considerably improved the life expectancy in HIV-infected populations in industrialized countries, efforts to reduce smoking and alcohol consumption must be a priority in HIV medicine.

Finally, a few words of caution are in order. The study is based on deaths in 2000, and therefore restricted to a period when the experience with HAART was still limited. Indeed, the longer-term consequences of using this effective medication—in terms of its risk to benefit ratio—in various population settings remain to be defined. The investigators have undertaken extensive efforts to collect detailed information on deceased individuals. However, there is no simple and agreed method of obtaining accurate information at and after the death of a person. For example, information from hospital records and on death certificates do not always agree and no gold standard is available.[15,16] Classification of deaths can also be difficult, for example when faced with sudden deaths in middle-aged patients with a history of intravenous drug use. More importantly, comparing the proportion of a certain cause of death across groups of patients cannot substitute analyses of absolute risks derived from appropriate numerator and denominator data.[17] Here, prospective cohort studies of HIV-infected individuals can make important contributions, particularly when several studies are analysed collaboratively in order to increase statistical power.[3,4,14] It is, however, essential for such studies to implement standardized procedures for the ascertainment and classification of causes of deaths. This is not the case at present, but should be introduced in the near future thanks to the efforts of a cross-cohort working group which, co-ordinated by the Copenhagen HIV Programme (www.cphiv.dk), is developing the CoDe (Coding Death in HIV) standards. These efforts, in combination with careful cross-sectional studies such as the one done by Lewden *et al*. will in the future inform the medical and wider community about the long-term outcomes of treated HIV infection.

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